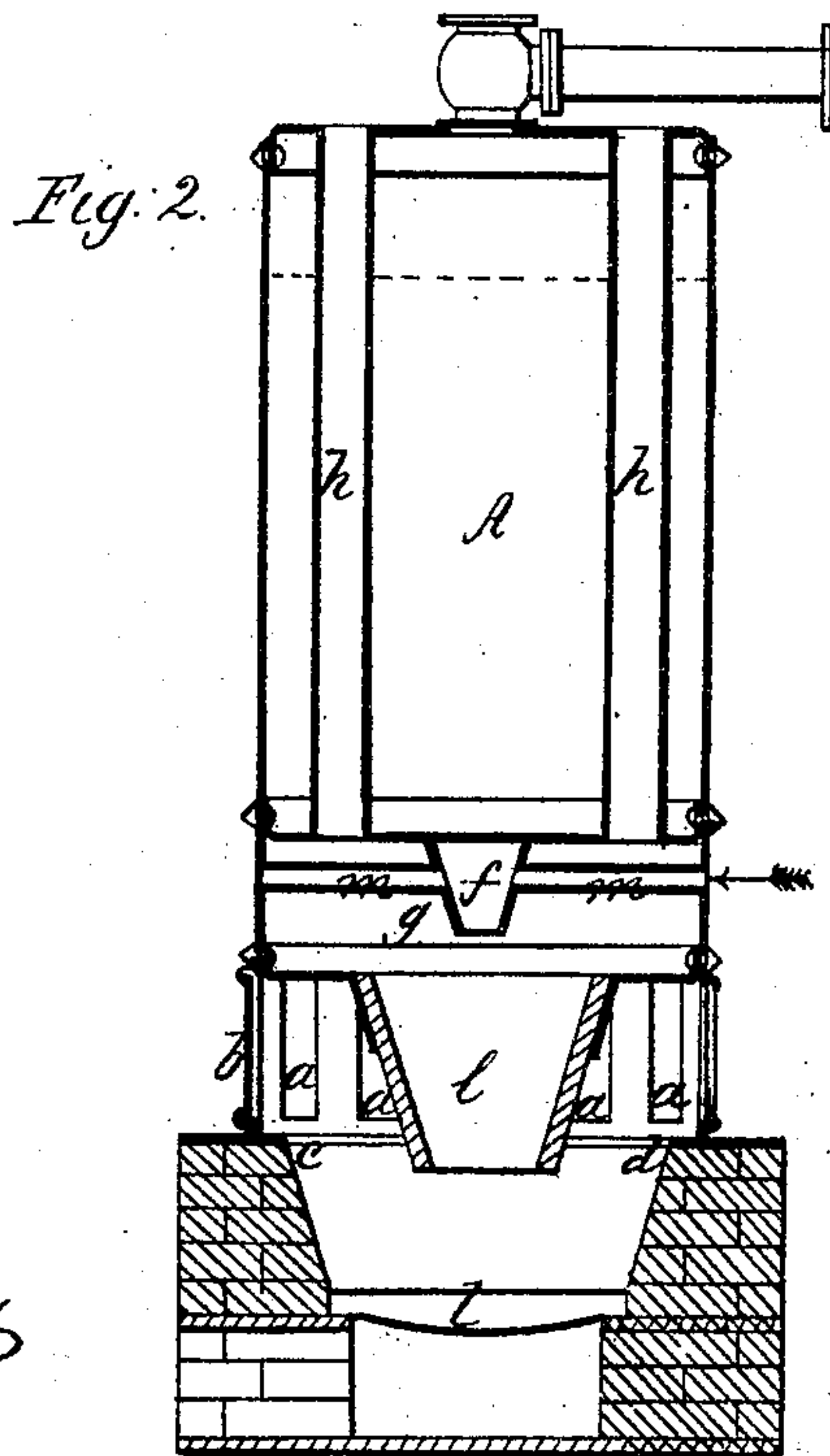
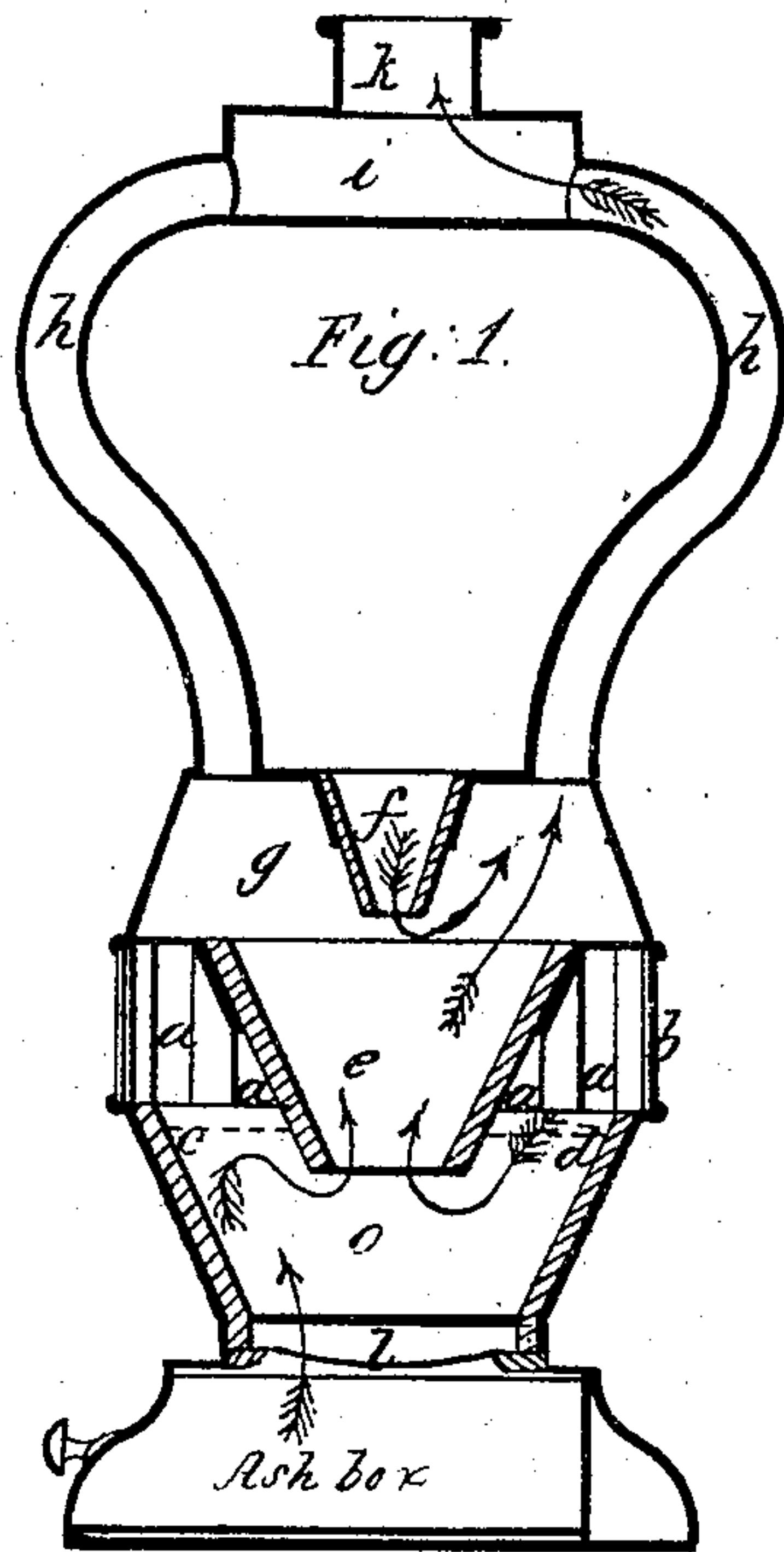


E. SLATER.
Hot-Air Furnace.

No. 99,015.

Patented Jan. 18, 1870.



Witnesses,
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ELI SLATER, OF PHILADELPHIA, PENNSYLVANIA.

Letters Patent No. 99,015, dated January 18, 1870.

HOT-AIR FURNACE.

The Schedule referred to in these Letters Patent and making part of the same

I, ELI SLATER, of Philadelphia, in the county of Philadelphia, and State of Pennsylvania, have invented certain Improvements in Smoke and Gas-Consuming Furnaces, of which the following is a specification.

My invention relates to improvements in the interior of gas and smoke-consuming furnaces, by providing them with a central conical tube, around which the fuel is placed, the object being to cause the smoke and gases to pass through the incandescent fuel, in such a manner that they will concentrate whilst undergoing combustion, instead of dilating, as is the case in that class of smoke and gas-consuming furnaces called "base-burners," in which the fuel is introduced into a central cylinder or magazine, from whence the heated gases pass into an annular space, where they, by reason of their tendency to fill the space, dilate, and thus are more difficult to ignite.

The second object of my invention is to obtain a better supply of air for the heated gases, when they are undergoing combustion, and to have said air heated to as high a temperature as possible, for which purpose an air-flue and combustion-chamber have been provided.

Figure 1 is a stove, constructed on this principle, and

Figure 2 represents the invention as applied to a steam-generator.

a a are openings, through which the fuel is introduced.

b b are doors for closing the same.

o, e, and *f* are conical tubes, made of fire-clay, as usual—*o*, for containing the fire, *e*, for concentrating the currents passing through the furnace, and *f*, for admitting hot air.

g is a combustion-chamber, from which the heat-radiating tubes *h h* convey the products of combustion to the drum *i* and out of the chimney *k*.

In fig. 2 like letters refer to like parts, and *A* represents a cylindrical vertical steam-generator, combined with the furnace proper.

The operation of the furnace is as follows:

The fuel is introduced through opening *a a*, figs. 1 and 2, which may be partially or entirely closed by annular sliding-doors *b*.

After the fire has been lighted, the fuel soon becomes incandescent, to the line *c d*, and the smoke and gases which are driven off from any additional fuel that is introduced through the openings *a a*, are compelled, as shown by arrows, to pass down through the ignited fuel, and into the small end of the conical tube *e*, near the lower edge of this tube. Combustion, in consequence of the constant hot currents that pass through the tube, becomes so intense and rapid that any gases or smoke passing by it are ignited and consumed with the greatest certainty.

As an additional safeguard, however, a further supply of air is admitted through the small conical tube *f*, the air having previously been heated by its passage between the radiating tubes *h h* and over the combustion-chamber *g*.

From this chamber the hot products of combustion pass through radiating-tubes *h h*, which latter may be increased in number and size, until the required amount of radiating-surface has been obtained.

The tubes converge in the drum *i*, fig. 1, from whence the products of combustion are discharged through the chimney *k*.

The lower part of the furnace is similar to an ordinary stove, with sufficient room for the fire between the lower edge of the tube *e* and the top of the grate-bars *l*.

In fig. 2 the furnace proper will be found similar to fig. 1, with the exception that the supply of air into the combustion-chamber is obtained through small tubes *m m*, radiating from the tube *f*, and passing through the outer shell of the combustion-chamber *g*.

The top plate of this chamber forms the bottom plate of the boiler, and the radiating tubes *h h* pass straight up through the water of the boiler, and out at the top, where they may enter the chimney.

I do not claim, as my invention, the idea of burning smoke and gas, by causing the same to pass through incandescent fuel; nor do I claim the central conical tube *e*, when the latter is used as a "magazine" or receptacle for the fuel; nor do I claim any of the parts of the furnace singly and in the abstract; but

What I claim, as my invention, is—

1. The arrangement of the openings *a a*, tube *e*, and combustion-chamber *g*, operating substantially as and for the purpose herein specified.

2. The combination of the tube *e* with the combustion-chamber *g* and conical air-tube *f*, substantially as and for the purpose hereinbefore set forth.

3. The combination of the tube *e* with the fire-pot *o* and grate *l*, when said tube *e* is used as and for the purpose herein specified.

4. The combination of the radiating-tubes *h h* with the combustion-chamber *g* and tube *e*, substantially as and for the purpose herein set forth.

5. The combination of the drum *i* with the radiating-tubes *h h* and combustion-chamber *g* and tube *e*, substantially as herein specified.

In witness whereof, I have this day affixed my hand, in presence of two subscribing witnesses.

Philadelphia, November 30, 1869.

ELI SLATER.

Witnesses:

CHAS. E. PANCOAST,
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